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Current Status and Future Plans

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CONTROL TECHNOLOGY CENTER
CURRENT STATUS AND FUTURE PLANS

by

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16. ABSTRACT The report gives the current status of, and future plans for, the Control Technology Center (CTC). Initially established to help reduce public exposure to toxic air pollutants in the ambient air, the CTC's program has been expanded to also include emission source and control technology assessments associated with air toxics, particulate matter, oxides of sulfur and nitrogen, and volatile organic compounds (VOCs), as well as emission measurements.

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PREFACE

As Co-Chairs of the Control Technology Center (CTC), we would like to introduce this document as one of the CTC's continuing efforts to inform all of the participants in the Nation's air quality program about the CTC and its contributions to this program. The success of the CTC is a result of the need to share technical assistance within the Nation's air quality program and the cooperation among State and Local air pollution control Agencies, the U.S. Environmental Protection Agency's (EPA) Regional Offices, and the three lead organizations, the Air and Energy Engineering Research Laboratory (AEERL), the Center for Environmental Research Information (CERI), and the Office of Air Quality Planning and Standards (OAQPS). As such, the CTC provides a unique and worthwhile service to this program. The CTC's efforts to provide technical support to State and Local air pollution control Agencies should enable these Agencies to better make the decisions required of them. At the same time, the CTC should grow to fulfill the changing needs of the Nation's air quality program for technical assistance. We expect that the CTC will fulfill these needs and predict the continuing demand for this type of technology transfer.

This report documents the activity of the CTC from its beginning in December 1986, through August 31, 1988; its formation and subsequent growth; and the CTC's plans for the future.

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Co-Chair
Office of Air Quality Planning
and Standards

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EXECUTIVE SUMMARY

In June 1985, the Environmental Protection Agency (EPA) announced a strategy to reduce public exposure to toxic air pollutants in the ambient air. The strategy called for State and Local authorities to take on an additional regulatory role, with EPA providing technical and financial assistance to their efforts. As a result of this shift in responsibility, EPA's Office of Research and Development (ORD) and Office of Air Quality Planning and Standards (OAQPS) developed and implemented the Control Technology Center (CTC), an innovative technical assistance program for State and Local air pollution Agencies and EPA's Regional Offices. The program has since been expanded to include not only air toxics but also emission source and control technology assessments associated with air toxics, particulate matter, oxides of sulfur and nitrogen, and volatile organic compounds (VOCs); emission measurements; and other areas as appropriate. Even though the CTC is not EPA's only technical assistance effort for State and Local Agencies, it is unique in its structure which is described in this report. The CTC is designed to be flexible so that it can accommodate needs as they arise and respond quickly to those needs.

The types of services provided by the CTC can be divided into three categories: telephone HOTLINE calls, direct engineering assistance projects, and technical guidance projects. The CTC HOTLINE is a telephone number that State and Local Agencies can call for easy access to EPA personnel who can provide prompt assistance in a variety of ways including consultations, references to pertinent literature, and access to EPA technical data and analyses. Direct engineering assistance projects are short term (about 3 months or less) and each provides technical assistance to one State or Local Agency. They tend to be specific in nature and may not be applicable to problems in other locations. Technical guidance projects tend to be longer-term (up to a year), broader in scope, and of national interest.

The CTC is a successful program that has shown significant growth since its formation less than 2 years ago. The number of HOTLINE calls and requests for assistance received from State and Local Agencies continues to grow. Engineering assistance and technical guidance projects have been well received with over 200 requests received for two of the completed project reports. Feedback from State and Local Agency personnel and groups such as STAPPA/ALAPCO has been positive. The continued increase in the number of calls and requests for assistance indicates the need for this program and further potential for growth.

This report documents the activity of the CTC from its beginning in December 1986, through August 31, 1988. Beginning in 1989, the CTC plans to issue a year-end report at the end of each fiscal year to discuss the CTC's activities for the year. This report includes a discussion of how the CTC was established, how the program has grown, and future plans.

BACKGROUND

In June 1985, EPA announced a strategy to reduce public exposure to toxic air pollutants in the ambient air. The Air Toxics Strategy, which encompasses concerns about both routine and accidental releases, coupled the responsibilities of traditional Federal regulatory programs, such as the National Emission Standards for Hazardous Air Pollutants (NESHAPs) and New Source Performance Standards (NSPS), with an increasing State and Local regulatory responsibility to achieve reduced air toxics risk to the public. The strategy called for State and Local authorities to take on an additional regulatory role, with EPA providing technical and financial assistance to their efforts. As a result of this shift in responsibility, EPA's 5-year Air Toxics Implementation Plan identified enhancement of State and Local air toxics programs as one of six key components to accomplish EPA's strategy.

The new emphasis and responsibility in State and Local air toxics programs and the need to transfer expertise from the Federal level to the appropriate State or Local level prompted EPA's ORD and OAQPS to develop and implement an innovative technical assistance program for State and Local air pollution Agencies and EPA's Regional Offices. The CTC began as an outgrowth of the needs identified in EPA's Air Toxics Implementation Plan. It is a collaborative effort among OAQPS's Emission Standards Division (ESD) and ORD's AEERL and CERI. Even though the CTC is not EPA's only technical assistance effort for State and Local Agencies in the area of air toxics, it is unique in its structure which is described in this report. It is designed to be flexible to accommodate needs as they arise and to respond quickly to those needs.

FORMATION AND ORGANIZATION

Representatives of OAQPS, AEERL, and CERI met in early 1987, to discuss the CTC concept. They agreed that a Steering Committee would be formed to provide direction for the program. Steering Committee members were chosen from the management staff of the three groups with Chair and Chair-designate positions (referred to as the CTC Co-Chairs) rotated annually between AEERL and OAQPS. The Co-Chairs work with the staffs of ORD and OAQPS and may access contractor support to accomplish the goals of the CTC. The Steering Committee recognized that a close interaction with the State and Local air toxics program staff was imperative. As a result, the Advisory Workgroup was established to work with the Steering Committee to ensure that the CTC effectively addressed the needs of State and Local air toxics programs. Members of this group consist of State and Local Agency personnel and an air program representative from an EPA Regional Office. Figure 1 shows a block diagram for the CTC's functional structure.

A significant early decision reached by the CTC Steering Committee was to broaden CTC assistance from control of air toxics to control of all air pollutants including criteria pollutants. The Steering Committee made this decision when it realized that air pollution control programs at State and Local Agencies are interrelated and that their requests of the CTC would not be restricted to topics concerning control of air toxics alone. At that time, the CTC Steering Committee opted to be responsive rather than restrictive. That is, the CTC would respond as appropriate to concerns identified by State and Local air pollution Agencies rather than limit its assistance to air toxics problems alone. Since that time other technical areas have been added as appropriate. The program currently encompasses emission source and control technology assessments associated with air toxics, particulate matter, oxides of sulfur and nitrogen, and VOCs.

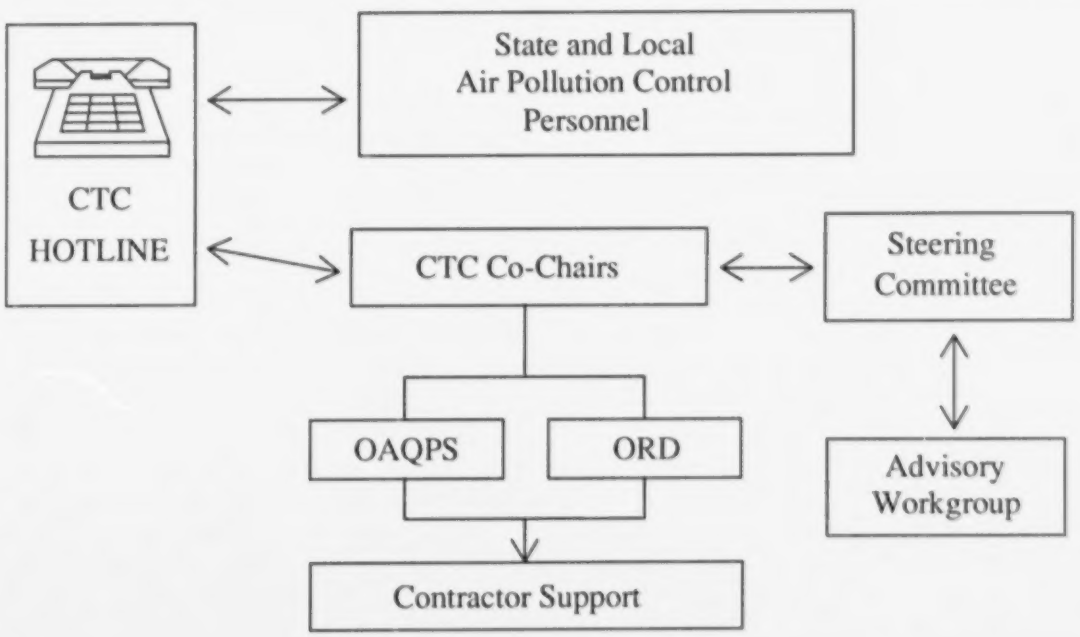

Figure 1. Participants in the CTC.

The Steering Committee acknowledged that a set of guidelines for operation should be established to formalize the agreements reached and to facilitate future operation of the CTC. These guidelines define the purpose of the CTC, the membership and responsibilities of the Steering Committee, the duties of the Co-Chairs, and communication procedures among CTC members. Another early key decision regards funding. Although each organization represented in the CTC receives separate funding, they agreed to pool resources for allocation by the Steering Committee. Finally, the CTC decided to set guidelines that it would use in selection and prioritization of projects for funding. The key guidelines established by the Steering Committee are:

- Needs identified by State and Local agencies (as opposed to the CTC's perception of their needs)
- Urgency of each problem as perceived by the requesting State or Local Agency
- Availability of the expertise necessary to provide a useful product
- Breadth of applicability of the product to other State and Local jurisdictions
- Investment of resources compared to the value of the product
- Cost of the project compared to the funds available
- Relationship of the work to other ongoing projects in EPA (e.g., potential to "piggyback" on or extend work of other projects)

The Co-Chairs manage the day-to-day operation of the CTC. They are the first contact for State and Local personnel. They are responsible for working with the managers in their respective organizations to select the appropriate technical personnel to respond to each request. They are knowledgeable of the status of projects in their respective organizations and keep the Steering Committee informed of the progress of each project. Finally, they work with the technical personnel to ensure that each project is within the technical, budget, and schedule guidelines established by the CTC. The Co-Chairs have been delegated the authority of approving small projects without the Steering Committee's input. This allows them to respond quickly to needs that may arise between meetings with the Steering Committee.

The Steering Committee meets monthly to discuss the budget and status of current projects. The meeting is also used as an opportunity to discuss and decide on potential projects. The Steering Committee is responsible for providing technical, budget, and schedule guidance for each project selected. The line managers of each organization are responsible for meeting the guidelines established by the Steering Committee and ensuring the quality of work performed for the CTC. In order to effectively combine the strengths of each organization, the Steering Committee asks that project teams be formed for each large project with representatives from at least two of the three participating organizations.

The Advisory Workgroup meets with members of the Steering Committee twice a year. The purpose of the meetings is to inform the Workgroup of the current CTC activities and to discuss issues requiring guidance from this special group. The input from the Workgroup has been valuable in determining how to most effectively meet the needs of the State and Local Agencies.

ASSISTANCE PROVIDED

The types of services provided by the CTC can be divided into three categories: telephone HOTLINE calls, direct engineering assistance projects, and technical guidance projects. The CTC HOTLINE is a telephone number that State and Local Agencies can call for easy access to EPA personnel who can provide prompt assistance in a variety of ways including consultations, references to pertinent literature, and access to EPA technical data and analyses. A tracking system is in place to ensure that each request receives a prompt response. An effort is made in every case to provide at least some assistance. For example, a literature search may be performed even if no EPA staff or consultant expertise is available.

The second type of service is direct engineering assistance. These are short term projects (about 3 months or less) that each provides technical assistance to one State or Local Agency. They tend to be specific in nature and may not be applicable to problems in other locations. They may be the result of a HOTLINE call which required an in-depth engineering analysis. In general, these projects have included review of control technology applications, plant inspections, and consultation on specific problems.

Technical guidance projects, undertaken by the CTC in its third level of assistance, tend to be longer-term (up to a year), broader in scope, and of national interest. They may be identified by a number of HOTLINE calls that are received on the same source or industry, a joint request from a group of air pollution Agencies, or comments and suggestions by the Advisory Workgroup. These projects may take the form of control technology documents, microcomputer software, or seminars and workshops, depending on the method that is chosen as the most effective technology transfer mechanism.

ACTIVITY TO DATE

HOTLINE

The HOTLINE is the focal point of the CTC. Many of the contacts are made through the HOTLINE with State and Local personnel who request assistance. The types of questions received through the HOTLINE have prompted the Steering Committee to enlarge the scope of the CTC from specifically air toxics and to enlist the help of other organizations to expand the base of available expertise.

As shown in Figure 2, the number of HOTLINE calls received each month has continued to increase throughout the life of the CTC. It is important to note that this figure does not include the hundreds of calls that have been received requesting CTC documents or that are made directly to EPA air program staff. The figure also excludes follow-up calls and a number of calls made directly to staff that escaped documentation. Based on an informal survey of EPA staff and an estimate of the requests for documents, an estimated 120 calls per month are currently received from State and Local Agency personnel.

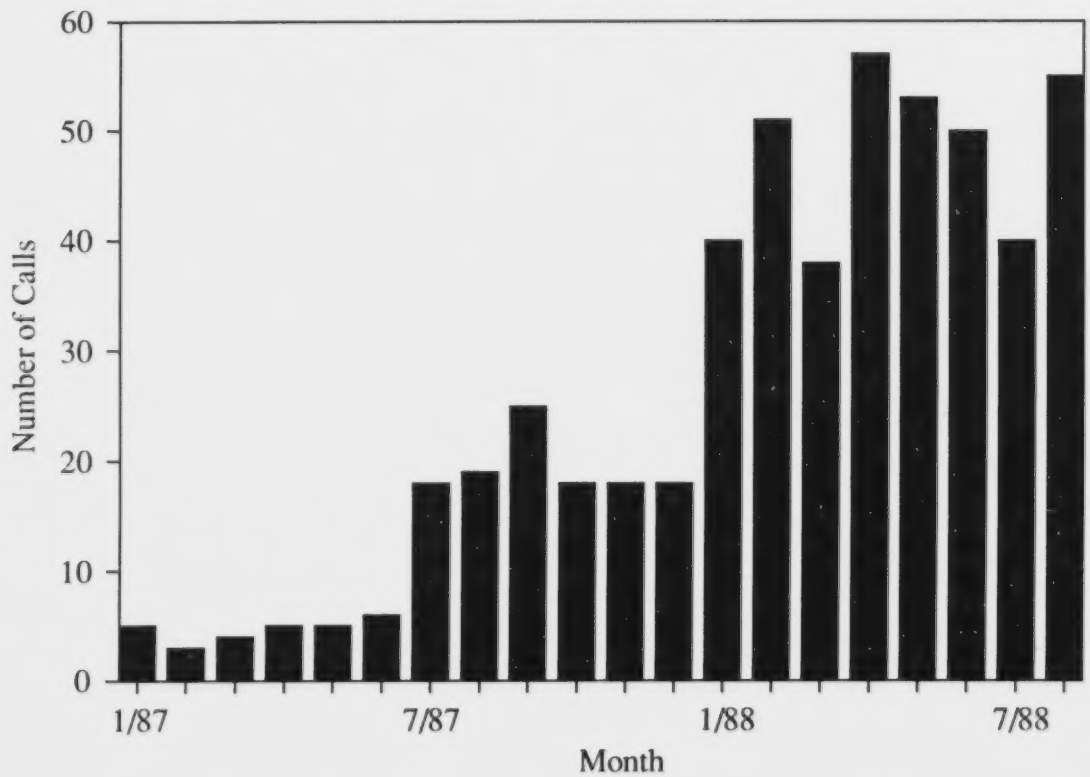

Figure 2. Number of HOTLINE calls received by month.

(Note: Numbers reflect only those calls made directly to the HOTLINE.)

The growth in the number of HOTLINE calls shows a direct correlation with activities to promote the assistance available through the HOTLINE. For the first 6 months of operation, activity was constant at about six calls per month. During June 1987, the first outreach activities began. Over 3000 one-page placards were distributed at the Air Pollution Control Association (APCA) meeting in New York City. The first of the several articles discussing the CTC appeared in the National Air Toxics Information Clearinghouse (NATICH) newsletter about the same time. The CTC Co-Chairs also sent over 500 letters to State and Local Agency personnel on the NATICH mailing list. For the next 6 months, about 20 calls per month were received. In January 1988, the CTC Co-Chairs presented information on the CTC at an Air Pollution Training Institute course for permit writers. The number of calls increased to about 40 per month. Additional activities that have occurred to inform State and Local Agency personnel about the assistance available have included visits to two State Agencies in Colorado and Texas which coincided with other official business, and a CTC exhibit and slide show at the APCA meeting in Dallas in 1988. The number of calls received by the HOTLINE currently averages 50 per month.

A number of calls related to ambient monitoring led to an agreement with EPA's Environmental Monitoring Systems Laboratory, Research Triangle Park, NC (EMSL-RTP). A contact for the CTC was designated by EMSL's Laboratory Director. All HOTLINE calls related to ambient monitoring and sampling techniques are sent to this central contact. The calls are then forwarded to the appropriate experts who answer the callers' questions. A similar agreement exists with the newly established Air Risk Information Support Center (Air RISC). Calls related to health effects are referred directly to Air RISC. Some calls involve complex issues that require assistance from other groups. For example, questions are sometimes received on the controls available for a particular emission stream and the health effects for the same emissions. In these cases, the issues are divided among the appropriate groups and the requestor will receive a separate response for each part of the request.

A second expansion which has broadened the base of expertise available through the CTC is contractor assistance. Several general work assignments have been issued which allow the CTC to involve contractors in answering questions received on the HOTLINE. This not only broadens the base of expertise available, but may also be used to supplement EPA expertise when workloads may not allow the quick response that is needed. This effort began in Spring 1988, with a very limited number of hours available on three contracts. Based on the initial response, the CTC Steering Committee decided to increase the level of funding available for the HOTLINE assistance and to further evaluate the service at the end of FY88. At that time, a decision will be made whether or not to continue the service.

HOTLINE DATABASE

A dBASE program was written in Spring 1988, to enter information on the HOTLINE calls. The database has allowed manipulation of the information received through the HOTLINE calls and will assist in selecting areas for work. The information presented in this report represents the HOTLINE calls received up to August 31, 1988. During this period 522 calls were received by the HOTLINE. Figure 3 shows the distribution of the calls among Regional Offices and State and Local Agencies. The majority of the calls (64.6%) are received from State Agencies. Fewer calls are expected from Regional Offices since there are only 10 in the U.S. and since they were not initially targeted as a primary client of the CTC. The number of calls received from Local Agencies (20.5%) suggests that they may not have been adequately informed of the assistance available through the CTC. Since Local Agencies employ approximately the same number of people as State Agencies, it seems reasonable to expect that roughly the same number of calls would originate from each. The other calls were received from universities, industry, and consultants.

Figure 4 shows the number of calls and the number of callers from each Region. This includes Regional Office and State and Local Agency personnel but does not include calls received from other sources. A total of 510 calls have been received from the 10 Regions. A significant number of these calls originated from the same people. This indicates that a significant number of people who request

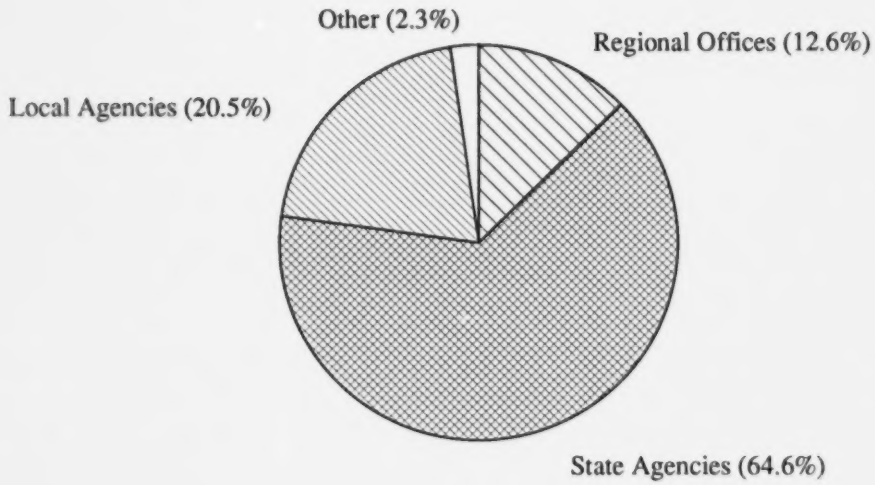

Figure 3. Distribution of calls by origin.

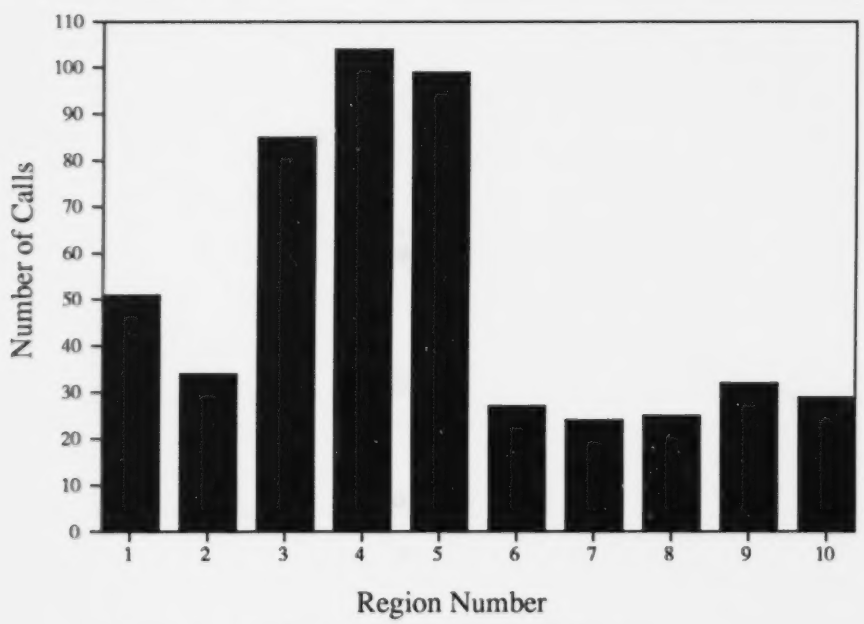

Figure 4. Number of calls received by Region.

(Note: Numbers reflect only those calls made directly to the HOTLINE.)

assistance using the HOTLINE call back with additional questions. The low number of calls received from some Regions may provide a basis for targeted outreach in the future. Figure 5 shows the distribution of calls by State.

The data base was sorted to determine the processes and pollutants that prompted HOTLINE calls. Tables 1 and 2 show the results. Similar processes with similar control strategies were combined, as were similar pollutants. HOTLINE calls from requestors seeking information on multiple processes or pollutants were separated and may appear in more than one category.

The CTC projects correspond somewhat to the processes which have received the largest number of calls. Five of the CTC's technical guidance projects (relating to traffic paint, automobile refinishing, hospital waste incineration, fiberglass, and municipal waste combustion) correspond to processes which rank in the top 10 processes shown in Table 1. The topics of other projects which appear in Table 1 are tire burning, wood products, air stripping, waferboard, and surface impoundment emission factors. The processes which were the subject of two or more HOTLINE calls represent about 61.3% of the total calls received. Many calls received were general and did not relate to a specific process.

The calls in Table 2 which listed VOCs or air toxics as the pollutant of concern were manually reviewed to determine if they could be assigned to specific chemicals. The questions in most cases were general. However, if specific pollutants were mentioned, the calls were assigned to the specific chemicals rather than the more general categories. Almost 95% of the calls received related to one of the chemicals listed in Table 2. Correlations between this list and the CTC projects are not as obvious, since most of the CTC projects relate to processes and include multiple pollutants. However, most of the projects relate to VOCs or air toxics. Two projects have dealt with specific chemicals which do appear on tables, isocyanates and formaldehyde.

The number of calls received relating to VOCs and other pollutants which are not air toxics confirms an early decision made by the CTC Steering Committee to expand the scope of the CTC assistance from just air toxics.

STAPPA/ALAPCO—CTC HOTLINE SURVEY

The Advisory Workgroup has recently completed a survey to evaluate the effectiveness of the HOTLINE assistance. The Workgroup contacted about 30% of those who requested assistance through the HOTLINE during 1987. Of the 42 surveys, 31 were returned. Most of the incomplete surveys had been returned by people who no longer worked for State or Local Agencies.

Figure 6 presents the response to several of the questions about the HOTLINE assistance. Most callers surveyed found the HOTLINE assistance to be helpful, quick enough, and supported by technical documentation. However, it was somewhat disturbing that almost 40% of the respondents found the HOTLINE assistance to be partially inadequate. Several of those thought the response was inadequate because the reply did not include supporting documentation. Although the HOTLINE will not be able to provide a satisfactory response in every case, efforts have been made to increase the supply of supporting documents. In one case, when answers were not readily available, an engineering assistance project was planned to address the need. When asked about the length of time required to obtain a response, over 90% of those surveyed received responses within a few days or less. Figure 7 shows how the HOTLINE assistance was used. Since the assistance was sometimes used for more than one purpose, the number of responses is greater than the number of surveys.

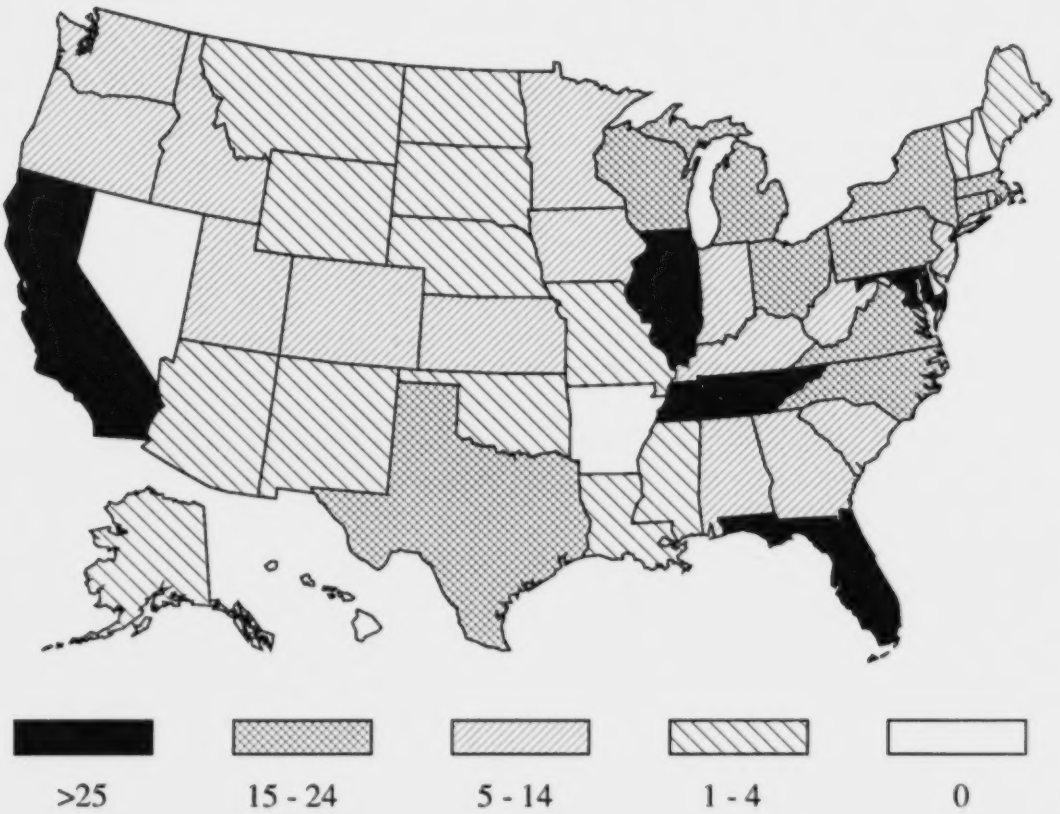

Figure 5. Number of calls received by State.

(Note: Numbers reflect only those calls made directly to the HOTLINE.)

Table 1. Distribution of Calls Received by Process

Process	Number of Calls	Percent of Total
Painting and Coating	34	6.5
Incineration (Miscellaneous)	32	6.1
Hospital Sterilizers	18	3.4
Chrome/Electro Plating	16	3.1
Incineration, Hospital	15	2.9
Fiberglass Manufacturing	15	2.9
Incineration, Municipal Waste	14	2.7
Coke Ovens and By-product Plants	13	2.5
Foam Blowing	12	2.3
Asphalt (Miscellaneous)	12	2.3
Boilers	10	1.9
Printing	10	1.9
Landfills	9	1.7
Treatment, Storage, and Disposal Facilities	8	1.5
Kraft Pulp/Paper Mills	7	1.3
Natural Gas and Petroleum Processing	7	1.3
Plastic Manufacturing	7	1.3
Waferboard	6	1.1
Air Stripping	5	1.0
Internal Combustion Engines	5	1.0
Degreasers	5	1.0
Tire Burning	5	1.0
Dry Cleaning	5	1.0
Foundry	4	0.8
Wood Products	4	0.8
Lead-Acid Storage Batteries	4	0.8
Smelters, Aluminum and Lead	4	0.8
Gas Turbines	4	0.8
Open Burning (Miscellaneous)	3	0.6
Sulfuric Acid Production	3	0.6
Brick Manufacturing	3	0.6
Paint Stripping	3	0.6
Steel Mills/Electric Arc Furnaces	3	0.6
Rubber Curing and Reclaiming	3	0.6
Airport Emissions	3	0.6
Incineration, Hazardous Waste	3	0.6
Furniture Manufacturing	2	0.4
Equipment Leaks	2	0.4
Total	318	61.3

Table 2. Distribution of Calls Received by Pollutant

Pollutant	Number of Calls	Percent of Total
Volatile Organic Compounds	123	23.6
Air Toxics	85	16.3
Particulates	40	7.7
Nitrogen Oxides	20	3.8
Ethylene Oxide	19	3.6
Sulfur Oxides	17	3.3
Formaldehyde	16	3.1
Chromium	15	2.9
Styrene	14	2.7
Metals	12	2.3
Benzene	11	2.1
Perchloroethylene	10	1.9
Lead	10	1.9
Isocyanates	9	1.7
Dioxins	9	1.7
Methylene Chloride	9	1.7
Hydrogen Chloride	8	1.5
Chlorofluorocarbons/Freon/Fluorocarbons	8	1.5
Fluorides	7	1.3
Hydrogen Sulfide	6	1.1
Trichloroethylene	6	1.1
Carbon Monoxide	6	1.1
Blue Haze	5	1.0
Polychlorinated Biphenyls	5	1.0
Herbicides/Pesticides	4	0.8
Carcinogens	4	0.8
Pathogens	4	0.8
Carbon Disulfide	4	0.8
Acetone	3	0.6
Toluene	2	0.4
Sulfuric Acid	2	0.4
Nitroarenes	2	0.4
Total	495	94.9

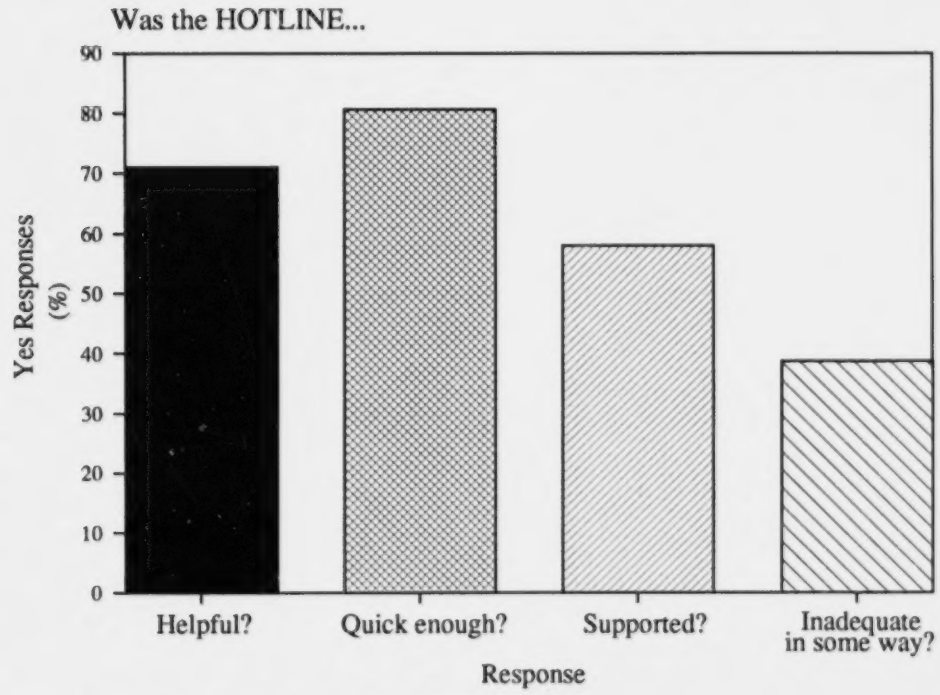

Figure 6. Results of the HOTLINE survey.

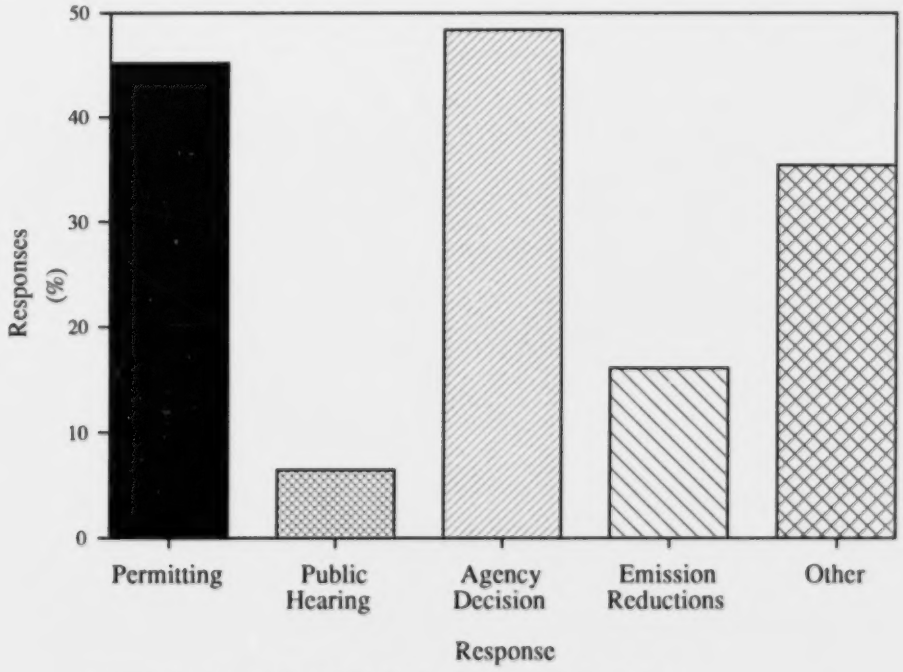

Figure 7. How the HOTLINE responses were used.

In general, nearly 70% of those surveyed understood the CTC program, and 29 of the 31 said they would use the HOTLINE again. The Advisory Workgroup recently expressed an interest in repeating the survey to include more recent calls. The second survey may be even more valuable than the first in demonstrating how people's perceptions have changed. The first survey will also serve as a baseline for any future surveys.

ENGINEERING ASSISTANCE AND TECHNICAL GUIDANCE PROJECTS

The CTC has initiated 24 engineering assistance and technical guidance projects. Project summaries and short descriptions of the 10 projects are presented in Appendix A. The titles of the completed projects are:

- "Air Stripping of Contaminated Water Sources—Air Emissions and Controls"
- Controlling Air Toxics (CAT) Advisory System
- "Evaluation of Emission Factors for Formaldehyde from Certain Wood Processing Operations"
- "Evaluation of Emission Sources at a Waferboard Manufacturing Plant"
- "Evaluation of Potential Emissions of TDI from Two Facilities"
- "Guidelines to Stack Testing of Municipal Waste Combustion Facilities"
- Investigation of Emissions from Burning of Agricultural Plastics
- "Reduction of Volatile Organic Compound Emissions from the Application of Traffic Markings"
- "Reduction of Volatile Organic Compound (VOC) Emissions in the Automobile Refinishing Industry"
- Workshops on Hazardous and Toxic Air Pollutant Control Technologies and Permitting Issues

A description, contact, and completion date are included for the current projects in Appendix B.

All products resulting from CTC projects are made available to State and Local Agencies free of charge. Industry and consultants are directed to the National Technical Information Service (NTIS) for documents. The technical guidance products, as anticipated, have found large audiences. For example, over 200 requests have been received for the document, "Air Stripping of Contaminated Water Sources—Air Emissions and Controls" and the computerized permit review program CAT. The Workshops on Hazardous and Toxic Air Pollutant Control Technologies and Permitting Issues, held in March and April 1988, drew over 300 attendees in both Raleigh and San Francisco. The engineering assistance documents have been requested by a much smaller number of people which may be due to the specificity of these projects.

Table 3 shows a breakdown of the CTC's projects by project type. Ten of the 24 projects are related to control technology evaluation. Software tools were the second most frequent type of project undertaken by the CTC. Three of the software products will be distributed for use on a personal computer while the fourth will be used in-house for HOTLINE assistance. Of the 24 projects, 9 are engineering assistance and 15 are technical guidance.

Table 3. CTC Projects by Type

Project Type	Total	Percent of Total
Control Technology Evaluation	10	41.7
Software Tools (a)	4 (b)	16.7
Emission Characterization	3	12.5
Workshops	2	8.3
General Information	2	8.3
Plant Inspection	1	4.2
Sampling Procedures Development	1	4.2
Training	1	4.2
Total	24	100.1

(a) Software tools are aimed at permit review, engineering evaluations, and estimation of emission factors.

(b) CAT was counted as two separate projects, one for each version.

FUTURE PLANS

MANAGEMENT REVIEW

Earlier this Spring, the CTC Steering Committee asked EPA's Office of Management Systems and Evaluation (OMSE) to evaluate the effectiveness of the CTC. The Steering Committee believed that this would serve to document the management structure and results to date and provide suggestions for improvement. Members of OMSE visited with representatives from ORD and OAQPS in July to discuss the CTC's objectives for the study and to learn more about the program. OMSE subsequently prepared a draft work plan which is now in review. OMSE representatives have recently met with the Advisory Workgroup to solicit their input on the most effective way to collect information from State and Local personnel. Areas which will be examined are: effectiveness of CTC assistance, outreach activities, relationships with Regional Offices, project selection, and management support and involvement.

OUTREACH

A continued outreach program is especially important since many State and Local Agencies are faced with high turnover rates. Most of the early outreach activity was directed toward State and Local Agency management, with hopes that the management would notify their staff of the assistance available through the CTC. However, the increase in HOTLINE calls from 20 to 40 per month after one presentation to about 25 permit writers illustrates the results when those who stand to benefit the most from this assistance are informed of its availability. Future outreach should be targeted to the staff level.

The Local Agencies should also be the target of some future outreach activity. In the initial announcement of the CTC's establishment, notices were sent only to the large Local Agencies. Perhaps a follow-up mailing should be distributed to all Local Agencies. Coincident with other official travel, visits have been made to two State Agencies, Texas and Colorado, and were very well received. Steering Committee members and others closely involved in the CTC should be encouraged to visit State and Local Agencies to discuss the assistance available through the CTC when their travel plans take them to the locations of these Agencies.

The CTC has announced much of its activity through the NATICH Newsletter. The Advisory Workgroup has recommended that the CTC consider establishing its own newsletter since many of the projects are not related to air toxics and reliance on NATICH may miss a portion of the target audience. The CTC Steering Committee is considering forming a joint newsletter with other groups which may have a similar audience such as Air RISC and the Best Available Control Technology/Lowest Achievable Emission Rate (BACT/LAER) Clearinghouse. An alternative is to make a concerted effort to place articles about the CTC in a variety of current newsletters. One problem is that most of the appropriate newsletters are distributed to industry and consultants as well as State and Local Agencies.

FUTURE DIRECTION

The CTC is generally perceived, both within and outside of EPA, as a successful program. Therefore, future plans are based on continuing the work while improving the existing system and looking for areas of improvement.

One area for growth being discussed is a network for State and Local Agency personnel. Many of these Agencies have developed expertise in particular areas that would be of assistance to other Agencies. In informal discussions with individuals from State and Local Agencies, response has been favorable. Details for implementing this plan are being discussed with the Advisory Workgroup. Tentative plans include developing a list of State and Local personnel who are willing to participate and their areas of expertise. After developing the list, the CTC will coordinate the needs that arise with the available expertise.

A recent briefing for EPA's Agencywide Technology Transfer Staff (ATTS) may lead to coordination with that group and greater visibility for some of the CTC products and activities. In its role in overseeing technology transfer within EPA, ATTS is in a good position to advise the CTC on future growth. It is also working to publicize technology transfer within the Agency and is interested in helping the CTC reach the right audience for the CTC products.

Although the CTC has been informally linked with other groups such as Air RISC and the BACT/LAER Clearinghouse, coordination between these groups and others should be improved. Already, the CTC and Air RISC work together to handle requests for assistance which involve control technology and health effects. These three groups as well as the Regional Centers and the Superfund Amendment and Reauthorization Act (SARA) Title III HOTLINE all provide assistance to State and Local air pollution Agencies.

The results of OMSE's evaluation are expected to yield suggestions for further improvement of the CTC. These suggestions will be carefully considered and integrated into the CTC program where appropriate.

The HOTLINE database program will be used to generate reports for several purposes. The types of tables presented earlier on common processes and pollutants will be generated to aid in selection of projects. Unfortunately, as seen in this report, there is very little consensus among the calls received, causing difficulty in predicting project topics. Reports showing who is responding to the HOTLINE requests and the amount of time being spent on this activity will be sent to managers in each organization. The reports will inform the managers of the HOTLINE activity and recognize those contributing to the program. Reports will also be sent to each Regional Office detailing the number of calls from the Region, and their origins and subjects.

CONCLUSIONS

The establishment of the CTC has proven to be an effective mechanism for technology transfer from EPA to State and Local Agencies. The structure of the CTC has allowed cooperation among the three groups involved (OAQPS, AEERL, and CERI) and input from STAPPA/ALAPCO and the Regional Offices. The CTC's team approach to the projects has combined the expertise and experience of regulatory and research and development personnel to maximize the quality and depth of the assistance provided.

The three levels of assistance have each been used with positive feedback from State and Local Agency personnel. The number of HOTLINE calls and requests for assistance continues to increase. The STAPPA/ALAPCO survey indicated that 93% of HOTLINE callers would request assistance again. Many callers do continue to call with new requests. Hundreds of requests have also been received for the documents and software products resulting from engineering assistance and technical guidance projects.

The magnitude of the demand for CTC services and the positive feedback received indicate that this program has satisfied a need among State and Local Agencies. The continued increase in the number of HOTLINE calls and requests suggests that the CTC may have an even greater role to play in the overall air program.

APPENDIX A

SUMMARY OF COMPLETED PROJECTS

"Air Stripping of Contaminated Water Sources—Air Emissions and Controls" (1)

The State of Florida requested assistance regarding the emissions generated by the air stripping of groundwater. Since the problems associated with these emissions were of national concern, the CTC Steering Committee decided to respond to the request by producing a guidance document on the sources and control of these emissions. Members of the CTC organizations familiar with air stripping of contaminated water were assigned to produce a document pooling the expertise on the subject from each organization.

Air stripping is used to remove VOCs from contaminated water and, if not designed and operated with air pollution controls, simply transfers the VOCs from the water into the atmosphere. Some of these VOCs contribute to ambient ozone formation, and other VOCs are potential human carcinogens or toxics. The CTC project team collected information and data on the air emissions and controls for air stripping of contaminated water as a source of VOCs. This information was collected through a literature search, telephone contacts and plant site visits. A major purpose of this effort was to investigate the air emission controls presently used for air stripping, their performance, and the capital and operating costs of these controls.

The CTC published a report to document this effort. This document includes a list of more than 150 air strippers, their locations, and the particular chemicals of concern in some of their VOC emissions. Design and operating data for several air strippers include water flow rates, VOC concentrations, column height and diameter, air flow, the reported removal efficiency, and other design factors. Air stripping facilities using air emission controls are listed and the applicable control systems are discussed in the context of these facilities. The capital and operating costs are estimated using actual facility data and standard EPA costing procedures. As an appendix to the document, telephone contacts with EPA, State and Local Agencies, operating facilities, and equipment vendors are listed.

During development of this technical guidance document, the CTC, along with State and Local representatives and EPA contractor support, performed three site visits. For each site, general information, process descriptions, and performance data for the air stripper and the air pollution control device are provided.

Controlling Air Toxics (CAT) Advisory System

The CTC and the New Jersey Department of Environmental Protection (NJDEP) collaborated to produce CAT, a computerized advisory system for evaluation of control devices for air toxics. The CTC anticipates that CAT will significantly aid the permit engineer in the review of permit applications. The engineering calculations are based on the EPA document Control Technologies for Hazardous Air Pollutants (2). This document has been used extensively by State and Local personnel with favorable results. However, in speaking with the users and examining the document, the CTC concluded that its applications would be even more useful in a computer program, eliminating the repetition of complex calculations.

The program was written for the IBM PC or equivalent and requires no special software to run. CAT uses a Lotus style menu which appears at the top of the computer screen with a description of each menu option and instructions to the user.

The permit reviewer enters information from the permit application including the air emission stream characteristics. A specific pollution control device is then selected for evaluation from the eight available control devices. The program then calculates design parameters and estimates costs for each control technology selected. The results can be compared against the applicant's actual or proposed design. The final product consists of the program on floppy disk and the Tutorial Manual for CAT (3).

The NJDEP plans to use CAT as a part of its overall goal to automate the permit review process. CAT will also assist in the maintenance of consistent engineering review techniques, including calculations, in an environment of high staff turnover and increasing numbers of applications being submitted.

"Evaluation of Emission Factors for Formaldehyde from Certain Wood Processing Operations" (4)

The CTC investigated the emission of formaldehyde in the furniture manufacturing industry in response to a request for assistance from the Virginia State Air Pollution Control Board. The report is intended to provide technical information for similar control decisions faced by State and Local regulatory Agencies.

The purpose of the report is to present to the State of Virginia a survey of the sources which contribute to formaldehyde emissions in the furniture manufacturing process and to estimate formaldehyde emissions from the most significant sources. The report discusses the impact of process variables and modifications on these emissions. The primary sources of information for this study include library and permit data base searches, telephone conferences, and meetings with members of the furniture and adhesive manufacturing industries.

While no furniture plant emission data were found, the investigators were able to substitute data from related industries, such as the particleboard manufacturing industry, and generate the following conclusions:

- The average emission rate of excess formaldehyde in resin is 4.7%.
- Furniture plants emit a lower percentage of excess formaldehyde than do particleboard plants.
- Comprehensive plant testing will be required to determine exact formaldehyde emissions from furniture plants.
- A standard bisulfite titration procedure should be adopted industry-wide before excess formaldehyde content can be accurately estimated by the titration technique.
- Process modifications have a significant impact on the formaldehyde emission rate and promise to be a very effective way to achieve a 50-75% reduction.

This study has provided the technological and methodological basis for the future research that is needed before the true range of formaldehyde emissions from furniture plants can be determined.

"Evaluation of Emission Sources at a Waferboard Manufacturing Plant" (5)

The State of Colorado Department of Health had received complaints of eye and lung irritation from residents near a waferboard manufacturing plant in Olathe, Colorado. The State requested assistance from the CTC in determining possible emission sources within the plant and assessing potential controls for those emissions. The results of a plant visit and a review of the plant operations and test reports are summarized in this report. The State of Colorado has also requested an investigation by the National Institute for Occupational Safety and Health.

Several activities were conducted during the course of the investigation. Data gathering involved collection of test reports, point source discharge (PSD) applications, and other information on waferboard manufacturing operations. States where waferboard is manufactured were contacted to establish controls used for various operations. A plant inspection was made to examine operations first-hand and to verify controls in-place. In addition, the State of Colorado offices were visited to discuss the extent of complaints, the stack tests conducted, and the results of modeling.

The facility uses methylene diphenylene isocyanate (MDI) as the polymer binder for wood wafers. According to the U.S. Department of Health and Human Services, MDI is a known irritant. These systems are now enclosed.

"Evaluation of Potential Emissions of TDI from Two Facilities" (6)

The Allegheny County Health Department, a Local Agency in Pennsylvania, was concerned with plants in its district that stored and used toluene di-isocyanate (TDI) in above-ground containers. The principal concern was the ability of these plants to deal with TDI emissions which might threaten the local population. The CTC was asked to assist in verifying the effectiveness of the existing control systems and techniques. A team of experienced EPA and contractor personnel was assembled to evaluate the available information, perform site inspections, and provide a report to the Local Agency.

The CTC report provided a hazard evaluation for the Local Agency and the findings from the plant inspections, including recommendations. The section on hazard evaluation provided relevant information on the physical and chemical properties of TDI, a discussion on the potential for sudden and accidental releases associated with the use of TDI at these facilities, and specific process evaluation for these facilities. The section on the facility visits documents the process step operations and procedures, including observations of how the process operators performed and potential actions that could contribute to accidental releases or spills.

The document describes and discusses the emission control systems (including a concurrent packed-tower scrubber) in use at these facilities. The recommendations made in the report include: improve fire protection and contingency plans, provide additional process monitoring and control, and improve spill procedures. The Allegheny County Health Department found this report helpful both for the specific facilities evaluated and in its review of similar sources.

"Guidelines to Stack Testing at Municipal Waste Combustion Facilities" (7)

This document presents the result of a project conducted by the Northeast States for Coordinated Air Use Management (NESCAUM) and the CTC to develop a consensus among members of an expert workgroup on guidelines for stack testing at municipal waste combustion (MWC) facilities. The workgroup was made up of representatives from EPA, State and Local Agencies, Environment Canada, firms operating MWC facilities, and professional organizations. A major objective of the project was to specify

a set of "core" measurement procedures that could be applied consistently to MWC facility testing by the various Federal, State, and Local jurisdictions. The document focuses on compliance testing, although recommendations on performance testing and research and development testing are also presented.

The objective of compliance testing is to determine if an MWC facility is operating within the limits imposed by regulations and those specified in its operating permit. On the basis of its understanding of current Federal and State permit requirements, the NESCAUM Workgroup determined the parameters that are likely to be measured during compliance tests. Numerical limits on emissions of the pollutants vary on a case-by-case basis.

The recommended measurement method for each parameter is described and referenced to an existing EPA method already in widespread use. The recommended method is supplemented by additional information on critical test features, quality assurance/quality control procedures, and data quality objectives. Other test concerns the document addresses include data quality criteria, facility operating conditions during testing, and testing multiple unit facilities.

The objective of performance testing is to determine if a facility is operating in accordance with its design specifications. Thus, while compliance testing usually involves sampling of the final stack effluent, performance testing may also require sampling both upstream and downstream of air pollution control devices. The testing may include any of the parameters listed under compliance testing as well as comparisons of control device efficiency and specific organic or inorganic chemicals. There are no test methods specific for performance testing.

The NESCAUM Workgroup recommends that additional research and development stack testing be performed to develop, improve, and expand data bases. It also recommends that stack tests be performed to assess the effects of controllable combustion parameters on emissions of specific pollutions. In addition, the Workgroup suggests more research to test hypotheses concerning the formation of dioxins and furans and evaluate new combustor technologies and new or improved sampling and analysis methodologies.

To make data comparison possible, the document includes a section on reporting format with sample tables, a list of data that should be compiled during a test, and a uniform reporting format. Reports of the results of MWC testing should meet the following criteria: clearly stated test objectives, uniform units of measure, and comparison of data quality objectives to actual data quality indicators. The Workgroup's recommendations on reporting formats concern facility operating status, combustion process data, pollutant emission data, conversion factors, reporting other data, and reporting "not detected" values.

Investigation of Emissions From Burning of Agricultural Plastics

The State of Florida's Department of Environmental Regulation contacted the CTC in May of 1987, to request information on the emissions from the burning of black plastic used in agriculture. The plastic is applied to the ground between crop rows to control weed growth and to retain moisture in the soil. The plastic is potentially contaminated with pesticide that is sprayed on the plants. The State was concerned about the emissions but had no information on them. The Steering Committee decided that engineering assistance would be appropriate in this case.

An ORD scientist was selected to head this engineering assistance effort. He witnessed a demonstration of plastic burning in the field and was supplied with samples of unused and contaminated plastics. He designed a sampling and simulation plan to determine the emissions from burning the plastic by simulating two modes of burning, pile burning and forced air curtain incineration, an alternative method considered by the State. The burn simulations were conducted in a small utility shed equipped with an air delivery system and small fans to simulate the two burning methods. Emissions were analyzed for

combustion gases, volatile and semivolatile organics, particulate material, and toxic and mutagenic activity. Emission samples and samples of the used plastic were analyzed for the presence of several pesticides to which the plastic may have been exposed.

No pesticide compounds were identified in either combustion emission samples or dichloromethane washes of the used plastic. Biological samples, examined using the Ames test in which bacteria were exposed to whole vapor and vapor/particulate emissions, showed no toxic or mutagenic effects under the conditions of the test. Compared to pile burning, forced air curtain incineration was found to decrease the time necessary to burn a given quantity of plastic and caused some reduction in the particulate concentrations emitted. There was no significant difference, however, in the organic compounds identified in samples taken under these two burn conditions.

In addition to providing the State of Florida with a draft technical paper discussing the results, the EPA scientist also attended a meeting at the State's request to present the paper and answer questions. While the State's original request was fulfilled, it has requested additional analyses to provide further identification of the higher molecular weight compounds detected and more health effects information. After the completion of these analyses, the paper will be finalized and submitted to a peer reviewed journal.

"Reduction of Volatile Organic Compound Emissions From the Application of Traffic Markings" (8)

The EPA has researched methods of controlling the emission of VOCs from the application of highway traffic markings as part of its ongoing effort to assist States in attaining the National Ambient Air Quality Standard for ozone.

This study was conducted to evaluate alternative traffic marking techniques that can be used to reduce VOC emissions from this source. The information was generated through a literature search and surveys of State Departments of Transportation, traffic paint formulators, and application equipment manufacturers. This document provides State and Local regulatory Agencies with information on traffic marking application processes, VOC emissions and emission reductions, and costs associated with the alternative marking techniques. This information will allow planners to identify available alternative low- and zero-VOC traffic marking techniques, estimate the baseline VOC emission level for the planner's geographic area, and evaluate the VOC reduction and cost of implementing alternative traffic marking techniques.

The primary conclusions from this study are:

- The use of available low- and zero-VOC alternatives such as waterborne coatings, thermoplastics, field-reacted materials, preformed tapes, and permanent markers can result in VOC emission reductions ranging from 15 to 100%.

- The annualized costs for the alternative marking techniques are less than or equivalent to those for traditional solvent-borne paints.

- The performance of the alternative markings is equivalent to or better than that of traditional solvent-borne paints.

The report provides the necessary descriptive and modeling information to allow State and Local Agencies to determine which category or categories of alternative marking technologies would provide the most cost effective VOC reductions, given the unique circumstances of the region involved.

"Reduction of Volatile Organic Compound (VOC) Emissions in the Automobile Refinishing Industry" (9)

The purpose of this document is to provide technical information that State and Local Agencies may use to develop strategies for reducing VOC emissions from automobile refinishing operations.

Automobile refinishing operations may be categorized into four process steps. These steps are vehicle preparation, primer application, topcoat application, and spray equipment cleanup. Emissions of VOCs are the result of organic solvent evaporation during vehicle preparation and equipment cleanup, and during and shortly after the application of primers and topcoats.

Emission reduction techniques that were selected for evaluation include the use of alternative coatings, spray equipment with improved transfer efficiency, and the installation of solvent recovery spray equipment cleaning systems. In estimating VOC emissions, VOC emission reductions, and costs of emission reductions, assumptions were made on the types of coatings used and equipment available for small, medium, and high volume facilities.

The results of the study indicate that several control options result in no additional cost to implement, but instead result in savings. For small, medium, and high volume facilities, significant VOC reductions (30-50%) can be achieved by replacing conventional air-atomizing spray guns with high-volume, low-pressure (HVLP) spray equipment. Cost savings are expected from this control technique because of the higher transfer efficiency achieved (about 65% for HVLP vs. about 35% for conventional air-atomizing spray equipment). Some problems with color matching topcoats have been reported. However, some users are reporting acceptable color matching results and have indicated that experience using the equipment is necessary to achieve good results.

For all facilities, significant VOC emission reductions can be achieved by using a solvent recovery system to clean up paint spray equipment. This control technique also results in savings because solvent usage is reduced.

The remaining alternative controls involve switching from conventional coatings to lower-VOC coatings (e.g., urethanes) and, with a few exceptions, result in additional cost. One exception is for facilities that use lacquers, where switching from lacquers to acrylic enamels is expected to result in a 45% emission reduction, as well as cost savings. The cost savings are a result of the lower cost of materials which offsets the capital cost (annualized over 10 yr) for installing a spray booth. Also, for all types of facilities, switching from conventional primers to waterborne primers is expected to result in a VOC emission reduction at no additional cost.

If multiple alternatives are implemented, the emission reduction achieved will not necessarily be the sum of the individual emission reductions indicated above. Since all the emission reductions are calculated from the baseline condition, once an alternative is implemented, subsequent implementation of other alternatives may have a different effect. Nonetheless, implementation of multiple controls will have a positive impact on VOC emission reduction.

Workshops on Hazardous and Toxic Air Pollutant Control Technologies and Permitting Issues

In 1987, EPA sponsored four National Workshops on Developing and Implementing Air Toxics Control Programs. The attendees of these workshops requested that they be followed by a more specific workshop dealing with control technology and associated permitting considerations for air toxics. The CTC Steering Committee agreed to provide this assistance and subsequently planned to hold two Workshops on Hazardous and Toxic Air Pollutant Control Technologies and Permitting Issues in 1988. The CTC asked STAPPA/ALAPCO to work with the CTC project team to determine the topics which should be discussed. STAPPA/ALAPCO agreed that this was an important area and worked with the CTC as a co-sponsor of the workshops. The specific objectives of the workshops were to:

- Communicate practical information on control technologies,
- Present actual experiences and case histories,
- Transfer state-of-the-art knowledge, and
- Promote uniformity in permitting of hazardous and toxic pollutants.

Two 3-day workshops were held, one in Raleigh, North Carolina, and one in San Francisco, California. The first 2 days were open sessions with over 300 attendees at each workshop representing EPA, State and Local Agencies, industry, and consulting firms. The general format included a technical speaker presenting information on a specific control device with case studies to illustrate application of the control device, followed by a speaker from a State or Local Agency to address the permitting concerns, specific problems, or issues associated with that device. Topics included traditional controls: incinerators, flares, carbon adsorption, absorption, and fabric filters as well as process modifications and fugitive equipment leaks. The attendees also met in small groups for discussion of specific permitting problems.

The third day was open only to State, Local, and EPA personnel to discuss policy and additional permitting issues. Factors and approaches relevant to determination of best available control technologies were discussed. EPA presented information on technical assistance available to the State and Local Agencies. In general, the workshops provided a forum for State and Local personnel to discuss common problems and share solutions.

REFERENCES

1. Vancit, M.A., R.H. Howle, D.J. Herndon, and S.A. Shareef. Air Stripping of Contaminated Water Sources—Air Emissions and Controls. EPA-450/3-87-017, NTIS PB88-106-166, August 1987.

2. Purcell, R.Y. and G.S. Shareef. Control Technologies for Hazardous Air Pollutants. EPA-625/6-86-014, September 1986.

3. Shareef, G.S., M.T. Johnston, E.P. Epner, D. Ocamb, and C. Berry. Tutorial Manual for CAT (Controlling Air Toxics) Version 1.0. EPA-600/8-88-092, August 1988.

4. Burklin, C.E. and T.S. White. Evaluation of Emission Factors for Formaldehyde from Certain Wood Processing Operations. EPA-450/3-87-023, NTIS PB88-118-492, October 1987.

5. Stelling, J.H.E. III. Evaluation of Emission Sources at a Waferboard Manufacturing Plant. EPA-450/3-87-021, NTIS PB88-107-735, September 1987.

6. Miles, A.J. Evaluation of Potential Emissions of TDI from Two Facilities. EPA-450/3-87-022, NTIS PB88-120-845, October 1987.

7. Haile, C.L. and J.C. Harris. Guidelines for Stack Testing at Municipal Waste Combustion Facilities. EPA-600/8-88-085, NTIS PB88-234-893/AS, June 1988.

8. Aurand, G.A., M.B. Turner, C.J. Athey, and R.M. Neulicht. Reduction of Volatile Organic Compound Emissions from the Application of Traffic Markings. EPA-450/3-88-007, August 1988.

9. Athey, C., C. Hester, M. McLaughlin, R. M. Neulicht, and M. Turner. Reduction of Volatile Organic Compound Emissions in the Automobile Refinishing Industry. EPA-450/3-88-009, October 1988.

APPENDIX B

SUMMARY OF CURRENT PROJECTS

Surface Impoundment Emission Factors

The CTC is developing PC-based methodologies and documentation for estimating emissions of volatile organics and air toxics from surface impoundments associated with wastewater treatment systems. The software will be available in October 1988. (David Misenheimer, 919-541-5473)

Evaluation of Air Emissions from a Wastewater Treatment System

The West Virginia Air Pollution Control Commission requested an evaluation of a wastewater treatment system at a chemical company which manufactures chlorinated hydrocarbons. The CTC will evaluate the company's emission controls and provide an impact analysis to the State by November 1988. (James Durham, 919-541-5672)

Arsine and Phosphine Scrubber Design

The CTC is evaluating the effectiveness of a scrubber for emissions of arsine and phosphine at a semiconductor manufacturing plant for the San Diego County Air Pollution Control District in California. The results of the evaluation are due November 1988. (Leslie Evans, 919-541-5410)

Wood Treatment Operations

The Virginia Air Pollution Control Board requested assistance in evaluating controls of emissions from a wood treatment operation. The CTC will investigate the control options for this type of source and report to the Agency by November 1988. (Bruce Moore, 919-541-5460)

Architectural Coating—Control Evaluation

The Connecticut Department of Environmental Quality has requested assistance from the CTC HOTLINE to obtain additional reductions in VOC emissions at an architectural coating operation. Completion of the project is expected in December 1988 (Dave Salman, 919-541-5417)

Hospital Waste Incinerator Operator Training Materials

The CTC, in collaboration with EPA's Region 3, the Maryland Air Management Administration, and EPA's Air Pollution Training Institute, is developing training materials for hospital waste incinerator operators. The State of Maryland is concerned about emissions from these sources which may be minimized by more efficient operation. A trial run of the course will be held in December 1988. (James Eddinger, 919-541-5426)

HAP/CAT Brochure

The CTC is preparing a short marketing brochure linking the Control Technologies for Hazardous Air Pollutants manual (1) and the Controlling Air Toxics (CAT) software. The brochure to be completed in January 1989, will describe the uses and availability of the brochure and the software as well as their application together. (Michael Kosusko, 919-541-2734)

Control Technology Evaluation Service

The CTC will be modeling several standard air pollution control systems—including air strippers, condensers, and steam strippers—using the computer program, ASPEN (Advanced System for Process Engineering). This project, scheduled for completion in January 1989, will allow the CTC HOTLINE managers to provide quick, order-of-magnitude evaluations of the design of air pollution control systems. (Robert Lucas, 919-541-5412)

Area Sources Technology Transfer

The CTC will be choosing three or four States which have developed innovative regulations for area sources. This effort will document the rationale for choosing the sources, development of the regulations, and plans for enforcement. The project is scheduled for completion in February 1989. (Sharon Nolen, 919-541-7607)

Fiberglass

The CTC is conducting a preliminary study to define the manufacture of fiberglass marine structures. This project will be a thorough assessment of the industry, related emission problems, and potential controls. It is scheduled for completion in February 1989. (Chuck Darvin 919-541-7633)

Emissions from Tire Burning

In response to a number of HOTLINE requests, the CTC will be conducting a study of the emissions from tire burning. This project is scheduled to begin in October 1988. (Paul Lemieux, 919-541-0962)

Workshops (Topic to be determined)

The workshops are to be held in the Spring or Summer of 1989. (Dennis Lussier, 513-569-7354)

REFERENCES

1. Purcell, R.Y. and G.S. Shareef. Control Technologies for Hazardous Air Pollutants. EPA-625/6-86-014, September 1986.